

Baseline Approval Decision for the Jumpstart Polymer and Liquids Scattering (JPLS) Endstation at

Brookhaven National Laboratory National Synchrotron Light Source-II

A. Purpose

The purpose of this document is to summarize the documentation that supports the decision of NSLS-II management to proceed with execution of the JPLS endstation.

B. Overview

The completion of a liquids scattering endstation was first approved by the NSLS-II management as part of the Soft Matter Interfaces (SMI) beamline. SMI, one of five NEXT beamlines at NSLS II, was descope to remove the liquids scattering endstation instrument due to budgetary constraints in 2015. Prior to this decision, the second SMI experimental hutch, that would house the liquids scattering instrument, was constructed and some related instrumentation was purchased and installed as part of the NEXT Project. Subsequent to this decision, a proposal entitled "Processing and Liquids Scattering (PLS)", for completing the second SMI endstation as an independent, canted undulator beamline, was presented and approved by NSLS-II management after favorable vetting from the NSLS II Science Advisory Committee (SAC). This proposal included an enhanced endstation instrument, compared to that envisioned as part of SMI, to provide added flexibility with the further capability of supporting large processing chambers, mostly for polymer processing. However, no funds for completion were authorized. To proceed with the capabilities envisioned as part of PLS, without the large cost associated with the canted undulator and photon delivery system, a proposal was made to jumpstart the PLS user capabilities by using the SMI beam in a timeshared mode and by completing a liquids scattering endstation. This project is now referred to as Jumpstart Processing and Liquids Scattering (JPLS).

JPLS will be executed as a self-contained project. Scope for this undertaking has been developed, as have cost and labor estimates and a resources-loaded schedule. The anticipated completion is Q2 in FY19. with an anticipated start in July 2017. Designs will be reviewed at the conclusion of the preliminary and final design phases, anticipated to occur at roughly 4 months and 9 months after the start of the project, respectively. The project will be led by Ben Ocko from the Complex Scattering Program of the Photon Science Division, providing nominally half-time effort throughout the project duration. Project support will be provided through a liaison engineer in the Photon Science Division providing nominally quarter-time effort and a scientist in the Project Management Group providing nominally one-tenth-time effort.

C. Baseline Scope

The Jumpstart Processing and Liquids Scattering endstation will utilize the SMI undulator and optics over an energy range of 6-24 keV. To switch operations between the JPLS endstation (12-ID-B hutch) and the SMI endstation (12-ID-C hutch), a shielded, interlocked beam transport pipe that stretches the length of the 12-ID-B hutch must be removed; the needed infrastructure to accommodate this (e.g. PPS) was implemented through the NEXT Project. JPLS will serve the liquids surface science community by providing them with critical capabilities to probe the normal and in-plane structure at liquid/vapor, liquid/liquid and liquid/solid interfaces with beams smaller than available at the existing counterpart US facility. JPLS will be only the second facility with such capabilities in the US. In addition, the same liquids spectrometer platform will be used for *in-situ* and operando studies of advanced manufacturing processes such as roll-to-roll and additive, both of which are well suited to the versatile horizontal scattering geometry with its heavy-duty vertical motion. The intense, small beam will allow for the mapping of the structural properties across large sample regions.

Development of the JPLS endstation authorized under this document will consist of the design, engineering, fabrication/procurement, assembly, installation, and testing of the endstation. The endstation instrument will be constructed using many existing components from the former 9-ID (APS) and X22B (NSLS) liquid scattering instruments. Beamline and endstation commissioning is outside of the presently authorized scope.

D. Program Cost and Schedule Baseline

The JPLS endstation is to be completed within the TPC of \$1.5M, which is priced with full overheads. Funds beyond \$1.5M construction are not authorized and must be explicitly requested. Funds in excess of the allocation to complete the scope of the JPLS endstation will be returned to NSLS-II operations. The proposed funding profile and schedule for the program is stated in the table below.

[\$K]	FY17	FY18	FY19	Total
Labor	140	516	109	765
Material	158	535	0	693
Travel	2	18	3	23
Total	300	1,069	112	1,481

JPLS Schedule Summary

	FY 17		FY 18				FY 19	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Management/Oversight								
Mechanical Design & Development								
Mechanical Installation								
Controls & EPS Design & Development								
Controls & EPS Installation								
Controls & EPS Testing								
DAMA Design & Development								
DAMA Installation and Testing								

E. Acquisition Strategy

The acquisition of the JPLS endstation will be conducted through the existing Management and Operating contract with Brookhaven Science Associates.

Procurement activities, including any long-lead procurements, will be accomplished to the extent feasible using fixed-priced subcontractors competitively selected by BNL on the basis of best value, price and other factors.

F. Environmental Strategy

All beamline projects, including JPLS, are regarded as falling within the envelope of the National Environmental Protection Act (NEPA) review of NSLS-II and the existing NSLS-II 2006 Environmental Assessment (EA) and hence no other NEPA documentation is required specifically for the JPLS endstation. Design, procurement, installation, and testing of the endstation will be covered under the BNL Integrated Safety Management (ISM) program and no additional ISM policies or procedures need to be developed.

G. Hazards Analysis

The Hazard Analysis which is applicable to the JPLS endstation is contained within the envelope of the NSLS-II Safety Assessment Document (SAD). The hazards associated with the JPLS endstation are similar in nature and magnitude to those already found in the NSLS-II, NEXT, ABBIX, and BDN Projects. The impact of any hazard will be minor on-site and negligible off-site.

H. Risk Management

Risk assessments are conducted throughout the project lifecycle and the identified risks will be monitored, assessed, and dispositioned as work progresses.

For the JPLS endstation, roughly half the cost is in materials and half in labor. The materials carry low technical risk. The coordination of matrixed labor resources could present a schedule risk to the JPLS project. This will be carefully monitored and conflicts in resource requirements addressed in the Project Management Oversight Group and in other NSLS-II management groups. Another category of risk for the JPLS endstation relates to the reutilization of components from APS and NSLS. This risk is mitigated by inspecting them as early as possible to provide the greatest amount of time to address any deficiencies. Finally, the project is exposed to variability in year to year budget allocations which will be addressed as budgets are allocated to NSLS-II operations.

I. Documents supporting the execution decision

- SMI/PLS Jump Start PowerPoint Presentation, Ben Ocko, given to SPMC on Feb. 21, 2017
- JPLS Proposal Excel Workbook 2.1 v 06, June 2017
- JPLS P6 Schedule with Cost, June 2017

22 June 2017

Submitted by:

Chris Stebbins

Date

JPLS Liaison Engineer, NSLS-II

Erik D. Johnson

Date

Deputy Director for Construction, NSLS-II

Recommendations:

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) approval of the Baseline proposed for JPLS.

Michael Bebon

Date Yes _____ No _____

Deputy Director for Operations, NSLS-II

Ron Pindak < hr/>Date Yes _____ No _____

Program Manager for Complex Scattering, NSLS-II

Paul Zschack

Date Yes _____ No _____

Photon Division Director, NSLS-II

Timur Shaftan < hr/>Date Yes _____ No _____

Accelerator Division Director, NSLS-II

Robert Lee < hr/>Date Yes _____ No _____

Environmental, Safety and Health Manager, NSLS-II

22 June 2017

Approval:

Based on the recommendation above and supporting documentation the Jumpstart Processing and Liquids Scattering project baseline is approved and the project is authorized to proceed. Funds in the amount of \$1,481K are to be released.

John Hill

Date

NSLS-II Facility Director, NSLS-II